WASHINGTON
SCIENCE TRENDS

HIGHLIGHTS

* SPECIAL OCEANOGRAPHY REPORT
* TECHNICAL TRENDS
* PUBLICATION CHECKLIST

Volume VI, No. 23 August 21, 1961

S P E C I A L O C E A N O G R A P H Y R E P O R T

The U. S. Government this week outlined for industry the problems and opportunities in "hardware" for the expanding national oceanographic and antisubmarine warfare research program. Primary emphasis is on instrumentation for data collection, recording and retrieval.

Instrumentation "Suits"

Government spokesmen have outlined their plans for so-called instrumentation "suits" designed to be used by various types of vessels in data collection. Various groups of instruments are to be placed in three major categories of ships. These are:

* Ships of Opportunity -- A wide variety of U. S. Government and commercial ships which could be used to take observations incidental to their primary missions, on a "not-to-interfere" basis.
* Synoptic Ship Systems -- These are ships such as radar and weather pickets which are generally "on station" for extended periods of time.
* Oceanographic Survey Vessels -- These are ships specifically designed and operated for the collection of oceanographic information.

Required Instruments

The following represents a brief description of the instrumentation which will be required for the three major ship systems.

Ø Ships of Opportunity

The special oceanographic instrument "suit" on "Ships of Opportunity" is primarily designed for ships underway, as during long transits between ports, extended operations in certain geographic areas, and involving special operations related to the primary mission of the ship. Components include:

✓ Sonic Sounding Set (AN/UQN type) to record 0 to 6,000 fathoms.
✓ Precision depth/graphic recorder for utilization with Sonic Sounding Set.
✓ Electronic Bathythermograph with associated winch-wire-boom-recorder/readout assembly.
✓ Automatic recording sea-surface temperature probe.
✓ Suit-case size meteorological instrument to record automatically key air-sea interface meteorological data, including total incident and reflected solar radiation.
✓ Towed magnetometer with an all-weather capability.
✓ An "interim" wave height measuring/recording device.

(continued)

Ø Synoptic Ship Systems

This is a specialized oceanographic, synoptic, collecting-reporting instrument system. It is designed especially for the rapid collection and reporting by radio communications of key oceanographic data. It will be used by ocean station vessels, radar picket ships, and selected combatant fleet units. These three ship classes will be employed primarily as part of a regional observation network, and secondarily as part of a mobile network, connected with the Anti-submarine Warfare Environmental Prediction System (ASWEPS).

The system includes modular sensors for:

✓ Depth measurement in the 0 to 2,500 feet range.
✓ Sea Surface temperature capable of determining the water temperature immediately at the air-sea interface.
✓ Sound velocity in the range of 4,500 to 5,500 fps.
✓ Conductivity, with two interchangeable modules.

Ø Oceanographic Survey Vessels

Individual Instruments/Equipments

□ Hydrographic Precision Scanning Echo Sounder

For use on oceanographic survey ships in conducting underway precision developmental (detailed) types of bathymetric surveys in deep oceanic areas. This instrument is needed to obtain a high resolution, stabilized, echo-sounding picture, including an automatically plotted contoured chart of the sea floor topography, extending a certain distance (about 2 miles in 4,000 fathoms of water) perpendicular to and on each side of the ship's track.

□ Current Meter for Conducting Coastal and Oceanic Subsurface Current Surveys

This is a precision instrument to be utilized on oceanographic survey vessels for conducting subsurface current studies and surveys in coastal and oceanic areas with the ship anchored or "lying-to". It must measure and record precisely the direction and speed of the subsurface currents.

□ Shipboard Wave Meter

This instrument will be utilized on oceanographic survey ships to measure and record the wave spectra in the oceanic areas for general survey and other purposes.

□ Multi-purpose, Constant Tension, Heavy-duty Oceanographic Winch

This winch will be used primarily to handle the majority of oceanographic instruments and will be utilized in most of the oceanographic survey operations. Some of these major types of operations include:

✓ Conducting "ocean-station" operations with ship "lying-to", in oceanic areas, during which a multiple number of instruments and sensors will be lowered to interim or maximum depth.
✓ Conducting deep or shallow ocean-floor dredging with either light or heavy loads.
✓ Conducting "bottom coring" operations.
✓ Conducting "towed operations", at varying speeds, utilizing various oceanographic instruments either singly or in multiple groupings.

□ Sub-sea Floor Strata Profiler

To be utilized by oceanographic survey ships in determining the types, characteristics, and discontinuities in the upper layer sediments which cover the sea floor. In those oceanic areas where the sediment carpet is thin, it will be utilized to provide pertinent information concerning the basement rock structure.

- Small Craft, Shallow Water Echo Sounding Instrument

  To be portable and to be utilized primarily by those small craft carried on board oceanographic survey ships for the purpose of conducting detailed, controlled shallow water bathymetric surveys in continental shelf areas and rivers throughout the world.

- Surface Ship and Submarine Gravity Meter for Survey Use

  This is a precision instrument designed for survey use. It will permit the continuous measurement of gravity profiles from surface ships and submarines.

- Marine Electron Resonance Magnetometer

  To be utilized on oceanographic survey ships for the purpose of obtaining continuous profiles of the earth's total magnetic intensity.

- Self-contained, Deep-diving Oceanographic Sensing Instrument

  This instrument shall be designed for utilization from oceanographic survey ships to allow the measurement and recording of certain key oceanographic data simultaneously with other underway or stopped operations. Emphasis shall be placed on simplicity and rapidity of data collection.

- Surface Navigation and Buoy Location Transponder

  To be utilized on oceanographic survey ships during miscellaneous oceanographic operations for three purposes: (1) To permit seaward extension of existing shore navigation control stations in certain areas designated for specific survey assignments (hydrographic-oceanographic), (2) To aid in the location and "homing in" on deep-sea anchored buoys and/or other devices, and (3) To provide a system for establishing reference grids in extended ocean areas lacking electronic navigational aids for conducting special research and/or survey operations.

- Shipboard Dye Detector Probe for Oceanographic Investigations

  To be utilized on oceanographic survey ships for the direct detection and evaluation (quantitative) of certain dyes which are used in tagging water masses for the purposes of studying diffusion, turbulence, and ocean circulation.

- Deep Sea Plankton Sampler

  This is an instrument designed for "underway" operations from an oceanographic survey ship at moderate speeds. Its purpose is to permit quantitative sampling of a variety of sizes of plankton, at selected depths.

- Shipboard Gamma Ray Detector of Nuclear Waste in the Sea

  To be utilized on oceanographic survey ships for identifying and measuring abnormal gamma ray concentrations in the ocean areas, such as would result from nuclear powered vessel refuse and special concentrations from other sources, such as nuclear waste dumping grounds and experimental nuclear tests conducted at sea.

- Oceanographic Radioactive Water Sampler

  To be utilized on oceanographic survey ships for the purpose of collecting sea water samples in order to trace and investigate radioactivity background and anomalies.

- Underwater Camera

  To be utilized on oceanographic survey ships for the purpose of obtaining close-up photographs, both single-frame and stereo, of the detailed topography of the sea floor. It will also be employed for photogrammetric mapping of the sea floor.

□ Sea Floor Sampling System

This is primarily a series of interchangeable bottom sampling devices designed for utilization by oceanographic survey ships in the collection of various samples of the sea floor.

□ Sea Floor Geothermal Probe

To be utilized on oceanographic survey ships, with the ship stopped ("lying-to"), to measure the heat-flow characteristics and values across and within the sea floor sediments.

Instrument Systems

□ Shipboard Oceanographic Survey System

To be utilized on oceanographic survey ships incorporating the most up-to-date techniques for collection, storage, reduction, and possible transmission of oceanographic data.

□ Precision Navigational Control System for Oceanographic Survey Operations

To be utilized by oceanographic survey ships for obtaining precise navigational positioning incidental to routine oceanographic surveys and/or special oceanographic investigations.

□ Master Oceanographic Shipboard Data Logging and Processing System

To be utilized on oceanographic survey ships. In view of the many ships scheduled to be employed in ocean-wide research and survey programs, it is imperative that the maximum quantity of data possible be processed on board ship. This data processing system, through being sufficiently versatile to handle a variety of data inputs, should provide the required on-board data analyzing, logging, processing, and storage capability. This system will expedite the availability of "smoothed" field data for utilization by either the scientific leader or survey party chief "in the field" in order to achieve optimum results.

□ Towed Subsurface Instrument System

This device is designed for utilization on oceanographic survey ships for underway operations to obtain horizontal profiles of certain key oceanographic variables. It is to be a streamlined, compact platform to which will be attached modular sensors and other special miniaturized instruments capable of being towed submerged at moderate speeds.

□ Air-sea Surface Interface Environmental Data Recording System

To be utilized by oceanographic survey ship primarily for underway operations, and secondarily for stopped operations, to sample and record the key environmental data found at and/or near the air-sea interface.

□ Marine Seismic Receiving System

To be utilized on oceanographic survey ships to measure and record the various characteristics of the structure of the sea floor as applicable to acoustical propagation studies of the water volume, the bottom sediments, and the underlying structures.

□ Underwater Television System for Sea Floor Investigations

To be utilized on oceanographic survey ships in coastal and oceanic areas to obtain continuous observations of and to investigate the sea floor topography.

NOTE: Proceedings of this conference will be available at a later date. Pending publication, photocopies of detailed specifications and requirements for any instrument or system marked with a box □ are obtainable at $1 each from Service Department, Washington SCIENCE TRENDS, Washington 4, D. C.

TECHNICAL TRENDS

□ A new manual on the procedures for access to restricted information on civilian and military applications of atomic energy is available from the Office of Technical Information Extension, U. S. AEC, P. O. Box 62, Oak Ridge, Tennessee. Ask for TID-4558 (Third Revision). √√√ The new Inertial Guidance Maintenance Facility being built for the Air Force at Heath, Ohio, calls for the air filtration of 99.95 percent of all dust particles bigger than .3 microns -- or about one eighty-thousandth of an inch. √√√ AEC has agreed to supply selected scientists in five European countries with 12 samples of four rare transplutonium elements: americum-243; curium-244; berkelium-249 and californium-252. Results from attendant research will be made available generally.

□ The Information Office, Business and Defense Services Administration, Washington 25, D. C. has available Announcement BD-61-136 detailing increased shipments of electrical measuring instruments by U. S. manufacturers in the first quarter of 1961. √√√ National Aeronautics and Space Administration will hold a public hearing at its Washington headquarters September 20, 1961 on its proposed new patent regulations which include provisions for exclusive and non-exclusive royalty-bearing license provisions. √√√ A detailed summary of the Ferroalloy industry in 1960 is available as Mineral Market Survey Report M. M. M. S. No. 3256 from the Branch of Ferrous Metals, U. S. Bureau of Mines, Washington 25, D. C. √√√ United Technology Corporation, Sunnyvale, California hopes to follow up its recent successful firing of a 220,000 pound thrust segmented solid propellant rocket motor with a test engine of similar design and almost 500,000 pounds thrust before the end of 1961. √√√ The Office of Information, Office of Aerospace Research, U. S. A. F., Washington 25, D. C. has available Release No. 8-16-1 listing the first basic research grant and contract awards for the current Fiscal Year. √√√ Details of the NASA S-3 Energetic Particles Satellite are available in Release No. 61-172 from the Public Information Office, NASA, 1520 H Street, N. W., Washington 25, D. C.

□ Metallic components recovered from Discoverer satellite capsules placed in polar orbits have revealed greatly increased yields of radionucleides as compared with iron and stone meteorites. The yield of tritium was particularly high. √√√ The Air Force has been advised that it may run into severe problems of image distortion and degradation if its Dyna-Soar boost glide vehicle is to be used in target location and reconnaissance missions. √√√ Chairman Melvin Price (D) Illinois, has called Atomic Energy Subcommittee hearings for August 28 and 29 on progress being made in the development of nuclear rockets and other devices for use in space. √√√ The U. S. Bureau of Mines expects to publish later this year a comprehensive report on electrostatic separation of granular minerals.

□ The U. S. Bureau of Mines, Washington 25, D. C. is asking for industry comment on its plans to increase the wholesale price of helium from $19 to $35 a thousand cubic feet. The Bureau will use much of the money to buy helium from private producers as a conservation measure. √√√ Douglas Aircraft and the National Science Foundation will install two sensitive riometers in the Antarctic for the study of low energy solar cosmic ray events, of interest in space travel. √√√ The U. S. Government is inviting more than 100 nations to send one or two meteorologists to a ten-day workshop on weather satellites to be held in Washington, November 13-22, 1961. √√√ Communications Industry Division, BDSA, U. S. Department of Commerce, Washington 25, D. C. has available single free copies of a "Telecommunications Survey of Latin America" covering U. S. market potentials for U. S. producers in Trinidad, Mexico, Jamaica, Uruguay, Paraguay, Venezuela, Argentina and Bolivia. √√√ Information on a January, 1962 Symposium on Optical Character Recognition is available from Miss Josephine Leno, Code 430A, Office of Naval Research, Washington 25, D. C.

PUBLICATION CHECKLIST

- ☐ RADIATION SHIELDING AND MANNED SPACE FLIGHT, a comprehensive report on the radiation hazards to which future astronauts may be exposed, and some possible means of providing the required shielding. 45 Pages. Single Copies Free. (Write National Aeronautics and Space Administration, 1520 H Street, N. W., Washington 25, D. C., ATTN: CODE BID for NASA Technical Note D-681)

- ☐ PATENT LAWS, a compilation of statutes relating to patents or to the U. S. Patent Office. 97 Pages. 30 Cents. (Write Superintendent of Documents, Government Printing Office. Washington 25, D. C. for Publication No. C 21.7:961)

- ☐ OILFIELD INSTRUMENTAL TECHNIQUES, a review of many new or modified techniques for analyzing oilfield waters by flame spectrophotometric, potentiometric and colorimetric methods. 45 Pages. Single Copies Free. (Write U. S. Bureau of Mines, Publication-Distribution Section, 4800 Forbes Avenue, Pittsburgh 13, Pa. for Report of Investigations No. 5737)

- ☐ RECENT DEVELOPMENTS IN METALS JOINING, a summary of major developments in the technology of joining metals for the period February-April, 1961. 5 Pages. (Single copies free to Government contractors, subcontractors and their suppliers. Write Defense Metals Information Center, Battelle Memorial Institute, Columbus 1, Ohio for DMIC Memorandum No. 109)

- ☐ POLARIS NUCLEAR SUBMARINE SYSTEM, the recently declassified transcript of a statements, testimony and exhibits on naval nuclear propulsion and the Polaris system. 39 Pages. Single Copies Free. (Write Committee on Atomic Energy, F-88, The Capitol, Washington 25, D. C. for "Naval Reactor Program and Polaris Missile System")

- ☐ MILITARY ASTRONAUTICS, a report on the many controversies in The Pentagon over roles and missions in the Space Age. 37 Pages. Single Copies Free. (Write Committee on Science and Astronautics. New House Office Bldg., Washington 25, D. C. for House Report No. 360 -- Military Astronautics)

- ☐ COLORADO GOLD DEPOSITS, the publication is "guaranteed accurate." Most of the information has been available for many years, although not in this concentrated and indexed form. 12 Pages. $1. (Write Department of Publications, Colorado School of Mines, Golden, Colorado for "Guide to Colorado Gold Deposits" Good Luck!)

- ☐ INTERPLANETARY DUST, a compilation of references to significant papers relating to the study of interplanetary dust. 26 Pages. 25 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for Publication No. SI 1.12/2:5/8)

- ☐ RADIOMETRIC METHODS FOR INDUSTRIAL PROCESS CONTROL, a report by the Nuclear-Chicago Corp. for the Atomic Energy Commission which finds this method to be of wide applicability, good accuracy and advantageous in certain process control applications. (TID-11306 available through AEC channels or at $1.50 from OTS, U. S. Department of Commerce. Washington 25, D. C.)

- ☐ SCIENTIFIC AND TECHNICAL PERSONNEL IN STATE AGENCIES, a report designed to show that scientists, engineers and technicians account for nearly ten percent of all state government employees. 67 Pages. 45 Cents. (Write Superintendent of Documents, Government Printing Office. Washington 25, D. C. for Publication NSF 61-17)

- ☐ DIRECT ENERGY CONVERSION DEVICES, a list of 208 unclassified references on nuclear direct energy conversion devices, particularly auxiliary power systems for use in Satellites. 23 Pates. (Report TID 3561 available through AEC channels or at 50 cents from OTS, U. S. Department of Commerce, Washington 25, D.C.)